

DISCUSSION OF THE AMENDMENT

New Claims 8 and 9 have been added. Claim 8 is simply a method for forming the laminate of Claim 7. Claim 9 excludes polyoxyalkylene polyols containing only two hydroxyl groups, and is supported in the specification at page 10, lines 2-5, and *In re Johnson*, 558 F.2d 1008, 194 USPQ 187 (CCPA 1977) (**copy enclosed**) (holding that a claim to a genus with a recital of a negative proviso that did not appear in the specification complied with the description requirement), as well as Examples 1 and 2, each of which exclude such polyoxyalkylene polyols.

No new matter has been added by the above amendment. Claims 1-9 are now pending in the application.

REMARKS

The rejection of Claims 1-7 under 35 U.S.C. § 103(a) as unpatentable over EP 218881 (Matsumoto et al) in view of JP 3-229773 (JP '773), is respectfully traversed.

As recited in present Claim 1, the invention is a coating composition to form a coating layer or film of a hydrophilic polyurethane resin having a moisture permeability and being non-porous, which comprises an isocyanate group-containing prepolymer obtained by reacting diphenylmethane diisocyanate with the following mixture of polyoxyalkylene polyols: a mixture of polyoxyalkylene polyols which contains at least 60 wt%, based on the mixture of polyoxyalkylene polyols, of a polyoxyethylene polyol, said polyoxyethylene polyol having at least three hydroxyl groups and having an oxyethylene group-content of at least 10 wt%, based on the polyoxyethylene polyol; wherein said mixture of polyoxyalkylene polyols satisfies $3.0 < n < 3.5$, where n is the average number of hydroxyl groups, and has an average oxyethylene group-content of from 60 to 90 wt%, based on the mixture of polyoxyalkylene polyols.

The claimed coating composition provides a coating layer or film having excellent mechanical properties, such as tensile strength, elongation and abrasion resistance by maintaining an adequate moisture permeability having a low degree of swelling upon absorption of water and is excellent in washing durability. Particularly, the coating composition of the present invention is a composition providing a cured product excellent in (i) water vapor permeability, (ii) flexibility and (iii) durability.

The above-discussed properties are attributed to two features of the presently-claimed invention, i.e., (1) that the average number n of hydroxyl groups in the polyoxyalkylene polyol satisfies $3.0 < n < 3.5$, and that (2) diphenylmethane diisocyanate be used as the diisocyanate.

The significance of these features is demonstrated in the comparative data of record, as shown in Table 1 at page 21 of the specification. Table 1, modified as discussed *infra*, is reproduced as Table 1a at page 9 of this response.

Examples 1 and 2 are according to the claimed invention; Examples 3-6 are for purposes of comparison. The examples exemplify films prepared and evaluated for properties as described in the specification at page 17, lines 5-20. Examples 1 and 2 demonstrate that the combination of the above two features results in lower moisture permeability, lower elongation, greater tensile strength, greater 100% modulus (M_{100}), and lower degree of swelling upon absorption of water.

In Matsumoto et al's invention, any polyisocyanate compound having at least two isocyanate groups can be used, and preferable such polyisocyanates are aromatic polyisocyanates such as, tolylene diisocyanate and diphenylmethane diisocyanate (page 17, line 8ff, and particularly lines 19-20). All the examples except one employ tolylene diisocyanate (Example 5 uses xylylene diisocyanate). Matsumoto et al discloses their polyoxyalkylene polyol component as (a) from about 50 to about 98% by weight of a polyoxyethylene polyol having an oxyethylene group content of from about 50 to about 90% by weight, a hydroxyl value of from 15 to about 60 and at least three hydroxyl groups, and (b) from about 2 to about 50% by weight of a diol having a molecular weight of from about 62 to about 2,000 which may contain oxyethylene groups; provided that the molar equivalent ratio of the component (b) to the component (a) is from about 0.2 to about 5, and the total oxyethylene group content in the components (a) and (b) is at least 70% by weight (page 5, line 26 through page 6, line 10). Matsumoto et al discloses that a particularly preferred initiator is a trihydric alcohol such as glycerol or trimethylolpropane (page 9, lines 9-11). In other words, preferred polyoxyethylene polyol (a) in Matsumoto et al contains an average number of three hydroxyl groups. Thus, since component (b) contains two hydroxyl groups,

the preferred “n” value in Matsumoto et al is between 2 and 3. Indeed, one of the examples of Matsumoto et al, i.e., Example 3, is very similar to (Comparative) Example 4 herein, since it uses the same triol, diol and tolylene diisocyanate components. In effect, Applicants have compared with the closest prior art, and shown results not predictable by the prior art.

The Examiner relies on JP ‘773 for its disclosure of diphenylmethane diisocyanate. However, it is not clear that JP ‘773 adds anything to the above-discussed disclosure of Matsumoto et al, which already discloses diphenylmethane diisocyanate as an applicable, although non-preferred, polyisocyanate component. There is nothing in JP ‘773 that discloses or suggests that diphenylmethane diisocyanate would be any better as a polyisocyanate component compared to other diisocyanates in the art, such as tolylene diisocyanate, generally, let alone in combination with Matsumoto et al’s polyol..

In the Office Action, the Examiner finds that Matsumoto et al’s average functionality range is broader than that of the 3.0-3.5 range recited in the present claims, and continues to hold that it would have been obvious “to operate at the upper end of the reference’s functionality range, because one would have expected the increased crosslink density resulting from using an increased functionality blend to reduce swelling of the films.”

In reply, Applicants respectfully dispute this holding, since the examples of Matsumoto et al, which represent their preferred embodiment, operate in an average functionality range, i.e., between 2 and 3, which is outside the presently-recited range. In addition, the newly-submitted Oguro Declaration provides additional evidence of patentability herein, relating to the degree of swelling upon absorption of oleic acid. In addition to the problems in the prior art described in the specification, there has also been a problem that the degree of swelling upon absorption of a body fat contained in sweat, particularly oleic acid, is high, and the coating layer deteriorates by sweat.

While the property of degree of swelling upon absorption of a body fat is not described in the specification, nevertheless, Applicants are entitled to rely on it now. As stated in *In re Zenitz*, 142 USPQ 158 (CCPA 1964) (**copy enclosed**), an advantage shown to be unexpected need not be described in the specification if it would inherently flow from a use that was described.

As described in the Oguro Declaration, the film obtained in Example 1 was cut out in a disc having a diameter of 45 mm and immersed in oleic acid at 80°C for 150 hours, whereupon the diameter of the disc was measured, and the degree of swelling upon absorption of oleic acid was measured in accordance with the following formula:

Degree of swelling upon absorption of oleic acid (%) = {(diameter after immersion in oleic acid - diameter prior to immersion in oleic acid)/diameter prior to immersion in oleic acid} × 100.

The degree of swelling upon absorption of oleic acid was carried out for all of the above-discussed Examples 1-6. The data, including the data in Table 1 as filed, is shown in the following Table 1a:

Table 1a

Example	Average number of hydroxyl groups	Average hydroxyl value	Moisture permeability (g/m ² ·24h)	Elongation (%)	Tensile strength (kg/cm ²)	M ₁₀₀ (kg/cm ²)	Degree of swelling upon absorption of water (%)	Degree of swelling upon absorption of oleic acid (%)
1	3.3	47.5	14,000	130	110	90	12	15
2	3.1	47.9	12,000	140	118	78	9	16
3	3.0	48.1	16,000	160	95	65	16	18
4	2.6	51.3	21,000	240	48	19	32	66
5	2.1	55.3	17,000	350	90	24	28	20
6	3.0	48.1	19,000	200	62	23	26	63

As discussed above, the coating composition of the present invention is a composition providing a cured product excellent in (i) water vapor permeability, (ii) flexibility and (iii) durability.

Particularly, with regard to durability, the product of the present invention is excellent in both durability to water and durability to sweat (body fat). It is possible to improve the durability with respect to relatively low swelling by increasing the functional group number of polyol ("n"), but water vapor permeability becomes poor. Thus, the above-listed properties cannot be controlled respectively independently, but interact with one another. That is, the present invention is characterized by providing a coating composition excellent in all of the above-listed properties (i) to (iii). In order to achieve the desired effect of providing performances excellent in all of the above properties i) to iii), the starting material properties of polyol must be specifically defined in such a manner as in Claim 1.

For example, in order to obtain a satisfactory water vapor permeability while being non-porous, it is necessary to establish an oxyethylene group content satisfactorily high. However, if the oxyethylene group content is too high, crystallinity increases, flexibility is impaired, and durability to water is lowered. Also, oleic acid resistance relates to oil (or fat) resistance, and this property becomes more satisfactory if the oxyethylene group content is higher. On the other hand, when increasing the hydroxyl group number, durability is improved, but flexibility becomes poor and water vapor permeability also deteriorates. Also, viscosity of a prepolymer tends to become high, and productivity is lowered when the viscosity is too high. One skilled in the art would not have been enlightened by the applied prior art how to make all of the above-discussed properties satisfactory in a good balance, and find that it could be accomplished with use of a polyol having a hydroxyl group number of higher than 3 and a high oxyethylene group content. Such a polyol may be conventionally known, but it is not a common product. Particularly, such a polyol having a high molecular

weight of a hydroxyl value of at most 60 and a high oxyethylene group content is rare. In the present invention, the present inventors have succeeded in achieving the above-discussed satisfactory properties (i) to (iii) in a good balance by employing such a specific polyol as defined in the claims.

In the Office Action, the Examiner finds that present Example 3 is representative of the prior art. In reply, there is no composition like Example 3 in the prior art. Example 3 is neither described by Matsumoto et al alone nor by JP '773 alone. Indeed, since the diol content in JP '773 is a minimum of 70 weight% of the polyol component, the average number of hydroxyl groups is likely less than 3.0 therein. To suggest, in effect, that Example 3 is the closest prior art, is in violation of applicable precedent. See MPEP 716.02(e) and the cases cited therein, especially *In re Chapman*, USPQ 711 (CCPA 1966) (**copy enclosed**) (Requiring applicant to compare claimed invention with polymer suggested by the combination of references relied upon in the rejection of the claimed invention under 35 U.S.C. 103 "would be requiring comparison of the results of the invention with the results of the invention." 148 USPQ at 714.)

For all the above reasons, it is respectfully requested that the rejection over Matsumoto et al in view of JP '773, be withdrawn.

All of the presently pending claims in this application are believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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In re Johnson and Farnham, 194 USPQ 187 (CCPA 1977)

In re Johnson and Farnham

**(CCPA)
194 USPQ 187**

Decided June 16, 1977

No. 76-643

U.S. Court of Customs and Patent Appeals

Headnotes

PATENTS

1. Claims – Indefinite – In general (§ 20.551)

Construction of specification and claims – By prior art (§ 22.20)

Analysis of 35 U.S.C. 112 second paragraph rejection should begin with determination of whether claims satisfy requirements of second paragraph; first inquiry, therefore, is to determine whether claims set out and circumscribe particular area with reasonable degree of precision and particularity; it is here where definiteness of language employed must be analyzed, not in vacuum, but always in light of teachings of prior art and of particular application disclosure as it would be interpreted by one possessing ordinary level of skill in pertinent art.

2. Claims – Indefinite – In general (§ 20.551)

Claims – Specification must support (§ 20.85)

Undue breadth of claims is not indefiniteness.

3. Construction of specification and claims – By specification and drawings – In general (§ 22.251)

Claim language must be read in light of specification as it would be interpreted by one of ordinary skill in art.

4. Claims – Indefinite – In general (§ 20.551)

Claims -- Specification must support (§ 20.85)

Pleading and practice in Patent Office – Rejections (§ 54.7)

Specification – Sufficiency of disclosure (§ 62.7)

Examiner's rejection premised on general ground that claims are "broader than the express limitation disclosed as defining the invention" and specific grounds that "express disclosure is clearly limited to the sigma value recited in claim 1," raises lack of enablement issue properly arising under first not second paragraph of Section 112.

5. Specification – In general (§ 62.1)

Specification -- Claims as disclosure (§ 62.3)

It is function of specification, not claims, to set forth "practical limits of operation" of invention; one does not look to claims to find out how to practice invention they define, but to specification.

6. Claims – Specification must support (§ 20.85)

Construction of specification and claims -- In general (§ 22.01)

Specification -- Sufficiency of disclosure (§ 62.7)

Specification as whole must be considered in determining whether scope of enablement provided by specification is commensurate with scope of claims.

7. Construction of specification and claims -- Broad or narrow -- In general (§ 22.101)

Patent grant -- Intent of patent laws (§ 50.15)

Specification -- Sufficiency of disclosure (§ 62.7)

Claims must adequately protect inventors to provide effective incentives; to demand that first to disclose shall limit his claims to what he has found will work or to materials that meet guidelines specified for "preferred" materials in involved process would not serve constitutional purpose of promoting progress in useful arts.

8. Applications for patent -- Continuing (§ 15.3)

Applicants are entitled to benefit of filing date of parent application that discloses invention of application in manner provided by Section 112, paragraph 1.

9. Claims -- Broad or narrow -- In general (§ 20.201)

Estoppel -- Involving interference (§ 35.20)

It is for inventor to decide what bounds of protection he will seek; it is applicant's right to retreat to otherwise patentable species merely because he erroneously thought he was first with genus when he filed.

10. Specification -- Sufficiency of disclosure (§ 62.7)

Notion that one who fully discloses, and teaches those skilled in art how to make and

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use genus and numerous species has failed to disclose and teach those skilled in art how to make and use genus minus two species and has thus failed to satisfy Section 112 first paragraph requirement results from hypertechnical application of legalistic prose relating to that provision of statute.

11. Pleading and practice in Patent Office -- In general (§ 54.1)

Specification -- Sufficiency of disclosure (§ 62.7)

While insufficiency under 35 U.S.C. 112 cannot be cured by citing causes for insufficiency, it is not true that factual context out of which question under Section 112 arises is immaterial; specification having described whole invention necessarily described part remaining after

invention of another was excised.

Particular patents -- Polyarylene Polyethers

Johnson and Farnham, Polyarylene Polyethers, rejection of claims 1-9, 64, and 68-72 reversed.

Case History and Disposition:

Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of Robert N. Johnson and Alford G. Farnham, Serial No. 230,091, filed Feb. 28, 1972, continuation-in-part of application Serial No. 295,519, filed July 16, 1963. From decision rejecting claims 1-9, 64, and 68-72, applicants appeal. Reversed; Lane, Judge, dissenting in part with opinion.

Attorneys:

Robert C. Brown and Aldo J. Cozzi, both of New York, N.Y. (James C. Arvantes, New York, N.Y., of counsel) for appellants.

Joseph F. Nakamura (Henry W. Tarring, II, of counsel) for Commissioner of Patents and Trademarks.

Judge:

Before Markey, Chief Judge, and Rich, Baldwin, Lane, and Miller, Associate Judges.

Opinion Text

Opinion By:

Markey, Chief Judge.

This appeal is from the decision of the Patent and Trademark Office (PTO) Board of Appeals affirming the rejection under 35 USC 102 or 103 (the rejection also raises a written description issue under 35 USC 112, first paragraph) of claims 1-9, 64, and 68-70 and the rejection under 35 USC 112, first paragraph (enablement) and second paragraph (indefiniteness), of claims 64 and 68-72 in appellants' application No. 230,091 filed February 28, 1972 (the 1972 application) for "Polyarylene Polyethers." ¹ The 1972 application is a continuation-in-part of three earlier applications, the earliest being application No. 295,519 filed July 16, 1963 (the 1963

application). We reverse.

Th Invention

The invention is in the field of polymer chemistry and more specifically relates to linear thermoplastic polyarylene polyether polymers composed of recurring units having the general formula

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where O represents an oxygen atom, ² E represents the residuum of a dihydric phenol ³ compound, and E' represents the residuum of a benzenoid compound having one or more inert electron withdrawing groups ⁴ in the ortho ⁵ or para ⁶ positions to the valence bonds and where both E and E' are bonded to the ether oxygens through aromatic carbon atoms.

Appellants describe a method of synthesizing these polymers by reacting a double alkali metal salt of a dihydric phenol with a dihalobenzenoid compound in the presence of certain solvents under substantially anhydrous reaction conditions.

The 1972 application includes the following disclosure with respect to the electron withdrawing group found in E' and in the E' precursor compound, that is, in the compound which is the predecessor of E' in the above general formula (we have designated paragraphs [A] and [B] and have added emphasis thereto):

Any electron withdrawing group can be employed as the activator group in these compounds. It should be, of course, inert to the reaction, but otherwise its structure is not critical. Preferred are the strong activating groups such as the sulfone group

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Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323. bonding two halogen substituted benzenoid nuclei as in the 4,4'-dichlorodiphenyl sulfone and 4,4'-difluorodiphenyl sulfone, although such other strong withdrawing groups hereinafter mentioned can also be used with equal ease.

The more powerful of the electron withdrawing groups give the fastest reactions and hence are preferred. It is further preferred that the ring contain no electron supplying groups on the same benzenoid nucleus as the halogen; however, the presence of other groups on the nucleus or in the residuum of the compound can be tolerated. Preferably, all of the substituents on the benzenoid nucleus are either hydrogen (zero electron withdrawing), or other groups having a positive sigma a1 value, as set forth in J.F. Bunnett in Chem. Rev. 49 273 (1951) and Quart. Rev., 12, 1 (1958). See also Taft, Steric Effects in Organic Chemistry, John Wiley & Sons (1956), chapter 13; Chem. Rev., 53, 222; JACS, 74, 3120; and JACS, 75, 4231. ⁷

The electron withdrawing group of the dihalobenzenoid compound can function either through the resonance of the aromatic ring, as indicated by those groups having a high sigma a2value, i.e., above about +0.7 or by induction as in perfluoro compounds and like electron sinks.

[A]

Preferably the activating group should have a high sigma a3value, preferably above 1.0, although sufficient activity to promote the reaction is evidenced in those groups having a sigma value above 0.7, although the reaction rate with such a low powered electron withdrawing group may be somewhat low.

The activating group can be basically either of two types:

(a) monovalent groups that activate one or more halogens on the same ring as a nitro group, phenylsulfone, or alkylsulfone, cyano, trifluoromethyl, nitroso, and hetero nitrogen as in pyridine.

(b) divalent group [sic] which can activate displacement of halogens on two different rings, such as the sulfone group

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; the carbonyl group

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; the vinyl group

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; the sulfoxide group

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; the azo group -N=N-; the saturated fluorocarbon groups -CF₂CF₂-; organic phosphine oxides

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; where R is a hydrocarbon group, and the ethylidene group

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where X can be hydrogen or halogen or which can activate halogens on the same ring such as with difluorobenzoquinone, 1,4- or 1,5- or 1,8- difluoroanthraquinone.

[B]

Those skilled in the art will understand that a plurality of electron withdrawing groups may be employed if desired, including electron withdrawing groups having a sigma a4value below about +0.7 provided the cumulative sigma a5influence on each of the reactive halogen groups of the halobenzenoid compound is at least about +0.7.

The Disclosure and Prosecution History of the 1963 Application

To understand the written description issue in this appeal, it is necessary to summarize the disclosure and prosecution history of the 1963 application. The 1963 application described (and claimed) in haec verba a genus of polymers as defined by the above general formula. That application stated:

The high molecular weight polyarylene polyethers of the present invention are the linear thermoplastic reaction products of an alkali metal double salt of a dihydric phenol and a dihalobenzenoid compound. Characteristically, this polymer has a basic structure composed of recurring units having the formula

-O-E-O-E'-

wherein E is the residuum of the dihydric phenol and E' is the residuum of the benzenoid compound, both of which are valently bonded to the ether oxygen through aromatic carbon atoms, as hereinafter more fully discussed. Polymers of this type exhibit excellent strength and toughness properties as well as outstanding thermal, oxidative and chemical stability.

The 1963 application then discussed the identity of E and the E precursor compound, that is, the compound which is the predecessor of E in the general formula. It stated:

The residuum E of the dihydric phenol of these alkali metal salts is not narrowly critical. It can be, for instance, a mononuclear phenylene group as results from hydroquinone and resorcinol, or it may be a di- or polynuclear residuum. Likewise it is possible that the residuum be substituted with other inert nuclear substituents such as halogen, alkyl, alkoxy and like inert substituents.

Such dinuclear phenols can be characterized as having the structure:

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wherein Ar is an aromatic group and preferably is a phenylene group, Y and Y₁ can be the same or different inert substituent groups as alkyl groups having from 1 to 4 carbon atoms, halogen atoms, i.e. fluorine, chlorine, bromine or iodine, or alkoxy radicals having from 1 to 4 carbon atoms, r and z are integers having a value from 0 to 4, inclusive, and R is representative of a bond between aromatic carbon atoms as in dihydroxydiphenyl, or is a divalent radical, including for example, inorganic radicals as

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, -O-, -S-, -S-S-, -SO₂-, and divalent organic hydrocarbon radicals such as alkylene, alkylidene, cycloaliphatic, or the halogen, alkyl, aryl or like substituted alkylene, alkylidene and cycloaliphatic radicals as well as alkalicyclic, alkarylene and aromatic radicals and a ring fused to both Ar group[s].

The application then mentioned by name some fifty specific dihydric dinuclear phenol (bisphenol) compounds which could be the E precursor compound. The application further stated:

A preferred form of the polyarylene polyethers of this invention are those prepared using the dihydric polynuclear phenols of the following four types, including the derivatives thereof which are substituted with inert substituent groups

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in which the R group represents hydrogen, lower alkyl, lower aryl and the halogen substituted groups thereof, which can be the same or different.

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Turning to the identity of the E' precursor compound, the application stated:

Any dihalobenzenoid compound or mixture of dihalobenzenoid compounds

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can be employed in this invention which compound or compounds has the two halogens bonded to benzene rings having an electron withdrawing group in at least one of the positions ortho and para to the halogen group. The dihalobenzenoid compound can be either mononuclear where the halogens are attached to the same benzenoid ring or polynuclear where they are attached to different benzenoid rings, as long as there is the activating electron withdrawing group in the ortho or para position of that benzenoid nucleus.

The 1963 application also included a discussion of the electron withdrawing group that was substantially the same as the paragraphs quoted above from the 1972 application.

The 1963 application contained twenty-six "examples" disclosing in detail the physical and chemical characteristics of fifteen species of polyarylene polyethers. One of the species was the polymer composed of these recurring structural units (which we designate as species [1]): ⁸
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Another species disclosed was the polymer composed of these recurring structural units (which we designate as species [2]): ⁹
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Appellants' 1963 application became involved in a three-party interference ¹⁰ which resulted in an award of priority adverse to appellants from which they did not appeal. ¹¹"] The sole count of the interference recited species [1].

After their involvement in the interference ended, appellants filed the 1972 application, and they sought broad claims which would at the same time exclude the subject matter of the lost count.

The Claims

Claim 1, now on appeal, is illustrative of the group of claims (claims 1-9, 64, and 68-70) which seek to exclude the subject matter of the lost count and which are involved in the 35 USC 102 or 103 rejection:

1. A substantially linear thermoplastic polyarylene polyether composed of recurring units having the general formula:
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where E is the residuum of a dihydric phenol and E' is the residuum of a benzenoid compound having an inert electron withdrawing group in one or more of the positions ortho and para to the valence bonds having a sigma a1value above about +0.7, and where both of said residuum [sic, residua] are valently bonded to the ether oxygens through aromatic carbon atoms *with the provisos that E and E' may not both include a divalent sulfone group and may not both include a divalent carbonyl group linking two aromatic nuclei.* [Emphasis added.]

The first "proviso" in claim 1, that "E and E' may not both include a divalent sulfone group," excludes species [1], the species of the lost count. The second "proviso," that "E and E' * * * may not both include a divalent carbonyl group," excludes species [2], which appellants state is

"analogous" or "equivalent" to species [1].¹²

Claims 64 and 71 are illustrative of the group of claims (claims 64 and 68-72) rejected under 35 USC 112, first and second paragraphs:

64. A substantially linear thermoplastic polyarylene polyether composed of recurring units having the general formula:
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where E is the residuum of a dihydric phenol and E' is the residuum of a

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benzenoid compound having one or more inert electron withdrawing groups in at least one of the position [sic, positions] ortho and para to the valence bonds having a sigma value *sufficient to activate a halogen atom* and where both of said residuum [sic, residua] are valently bonded to the ether oxygens through aromatic carbon atoms with the provisos that E and E' may not both include a divalent carbonyl group linking two aromatic nuclei. [Emphasis added.]

71. The process for preparing substantially linear polyarylene polyethers which comprises reacting substantially equimolar amounts of an alkali metal double salt of a dihydric phenol with a dihalobenzenoid compound *having halogen atoms activated by an inert electron withdrawing group* in at least one of the positions ortho and para to the halogen atom, under substantially anhydrous conditions and in the liquid phase of an organic solvent having the formula:
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in which R represents a member of the group consisting of monovalent lower hydrocarbon groups free of aliphatic unsaturation on the alpha carbon atom and, when connected together represents a divalent alkylene group, and Z is an integer from 1 to 2 inclusive. [Emphasis added.]

The Rejections

The sole reference relied upon by the examiner and the board is:

Netherlands 6,408,130 January 18, 1965

Claims 1-9, 64, and 68-70 were rejected under 35 USC 102 or 103 as unpatentable in view of the Netherlands patent, which is a foreign-filed counterpart of appellants' 1963 application.

Before the PTO, appellants conceded that the invention was fully disclosed in the

Netherlands patent. However, appellants contended that the claims are entitled to the benefit of the 1963 filing date under 35 USC 120, ¹³ and therefore the Netherlands patent is not available as a prior art reference.

The examiner and the board were of the view that the claims are not entitled to the 1963 filing date because the presently claimed subject matter is not "described" in the 1963 application as required by the first paragraph of 35 USC 112. ¹⁴ As explained by the board:

The question determinative of the issue at hand is thus whether or not appellants are entitled to the filing date of their parent application Serial No. 295,519, i.e., July 16, 1963. An answer to this question quite obviously depends on what is the invention defined by the instant claims. Is it the same as the one disclosed in [the] parent case or does it differ therefrom in a manner which precludes the instant claims from being afforded the filing date of the parent case?

Under the rationale of the CCPA as set forth in *In re Welstead*, 59 CCPA 1105, 463 F.2d 1110, 174 USPQ 449 (compare also *In re Lukach et al.*, 58 CCPA 1233, 442 F.2d 967, 169 USPQ 795, and *In re Smith [(I)]*, 59 CCPA 1025, 458 F.2d 1389, 173 USPQ 679), which we deem controlling, we are constrained to conclude that the present claims are not entitled to the filing date of appellants' parent case Serial No. 295,519. The claims at issue contain provisos that E and E' may not both include a divalent sulfone group and may not both include a divalent carbonyl group linking two aromatic nuclei. The artificial subgenus thus created in the claims is not described in the parent case and would be new matter if introduced into the parent case. It is thus equally "new matter," i.e., matter new to the present application for

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which no antecedent basis exists in the parent case. Consequently, appellants are not entitled to rely on the filing date of their parent case to support a new subgenus for which no basis exists in the parent case. The reason why appellants now limit their claims to exclude those species eliminated by the provisos, i.e., loss in an interference, is manifestly immaterial.

Having reached the conclusion that appellants are not entitled to the filing date of their parent case for the subject matter defined by the present claims which delineate a new subgenus not described in the parent case, it follows that the Netherlands patent is a valid reference which, by appellants' own admission, fully meets the claims. The indicated rejection of claims 1-9, 64 and 68-70 under 35 U.S.C. 102 as unpatentable over the Netherlands patent is thus affirmed. The alternative reliance by the Examiner on Section 103 is inconsequential, Section 102 of the statute being the epitome of Section 103. *In re Pearson*, (CCPA), 494 F.2d 1399, 181 USPQ 641.

Claims 64 and 68-72 were rejected under 35 USC 112, first and second paragraphs. In his Answer, the examiner stated that the claims were rejected under §112, first paragraph, for "being

broader than the enabling disclosure" and under §112, second paragraph, ¹⁵ for being "broader than the express limitations disclosed as defining the invention." The examiner said the "specific deficiencies of the claims and disclosure" are that the expression "to activate a halogen" (claim 64) is "indefinite" because "it does not specify toward what the activation is" and that "[t]he express disclosure is clearly limited to the sigma[a1] value recited in claim 1, for example: see [[A] and [B]]."

In affirming the examiner on these rejections, the board stated:

Further, claims 64 and 68-72 stand finally rejected under 35 U.S.C. 112 as being broader than the enabling disclosure (first paragraph) and broader than the express limitations disclosed as defining the invention (paragraph two).

It is the Examiner's position that "to activate a halogen atom" (claim 64) is indefinite and that the disclosure also is limited to dihalobenzenoid compounds not broadly merely "activated by an inert electron withdrawing group" (claims 68-72) but the activation must have a sigma a2value above about +0.7.

We agree with this rejection. The specification makes it quite clear that a minimum sigma a3activation value of the halogen atoms is required (note especially [[A]]) and an undefined sigma a4value thus lacks the requisite preciseness commensurate with the enablement of the disclosure.

Opinion

1. The Rejections of Claims 64 and 68-72 under §112

Claims 64 and 68-72 were rejected under both the first and second paragraphs of 35 USC 112.

[1]We begin with the rejections under the second paragraph of §112. As stated in *In re Moore*, 58 CCPA 1042, 1046-1047, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (1971):

Any analysis in this regard should begin with the determination of whether the claims satisfy the requirements of the second paragraph. * * *

This first inquiry therefore is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity. It is here where the definiteness of the language employed must be analyzed -- not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. [Footnote omitted.]

The examiner's §112, second paragraph, rejection was premised on the general ground that the claims are "broader than the express limitations disclosed as defining the invention" and on two specific grounds: (a) that the expression "to activate a halogen atom" is "indefinite" because

"it does not specify toward what the activation is;" and (b) that "[t]he express disclosure is clearly limited to the sigma[a5] value recited in claim 1, for example: see [[A] and [B]]." The board affirmed and stated: "an undefined sigma a6value thus lacks the requisite *preciseness* * * *." (Emphasis added.)

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Ground (a) focuses on the specific phrase "to activate a halogen atom." But the language is found only in claim 64, not in claims 68-72. Claim 68 recites "a dihalobenzenoid compound having halogen atoms activated by an inert electron withdrawing group," and claims 71 and 72 have a similar recitation. (Claims 69 and 70 depend from claim 68.) Those recitations clearly specify "toward what the activation is," as the examiner would require. Ground (a), therefore, lacks merit with respect to claims 68-72.

[2]Product claim 64 ¹⁶ defines the complete polymer structure by describing the constituents partially in terms of their functions in the reaction and by their linkage into the end-product polymer. The specification provides further guidance on the meaning of the E' term:

It is seen also that as used herein, the E' term defined as being the "residuum of the benzenoid compound" refers to the aromatic or benzenoid residue of the compound *after the removal of the halogen atoms on the benzenoid nucleus.* [Emphasis added.]

It is also clear from the specification as a whole, that two keys to the polymerization reaction are inert electron withdrawing groups particularly positioned on the benzenoid nucleus and a cumulative sigma a1value attributable to those withdrawing groups which is sufficient to activate a halogen atom on that nucleus. If the sigma a2value is not sufficient to activate a halogen atom on the benzenoid nucleus, the reaction will not take place and the polymer will not be made. See *In re Angstadt*, 537 F.2d 498, 190 USPQ 214 (CCPA 1976). The specification adequately details which sigma a3values are sufficient to carry out the reaction, and any person skilled in the art would immediately recognize from the above-quoted portion of the disclosure or the specification as a whole that the halogen atom mentioned in claim 64 was on the benzenoid nucleus prior to the reaction. It is clear that those skilled in the art would have no trouble ascertaining whether any particular polymer falls within the scope of claim 64. See *In re Goffe*, 526 F.2d 1393, 188 USPQ 131 (CCPA 1975). The questioned limitation is merely surplusage, since the claim would be definite with or without it. ¹⁷

[3]The point made by the board, that "an undefined sigma a4value" lacks "preciseness," is also unsound. ¹⁸ Claim language must be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Moore*, *supra*. As pointed out above, those skilled in the art will be able to determine immediately from appellants' detailed specification what level of activation (i.e., sigma a5value) is necessary to practice the invention. Cf. *In re Mattison*, 509 F.2d 563, 184 USPQ 484 (CCPA 1975). We conclude that the subject matter embraced by claims 64 and 68-72 is definite and that the claims set out and circumscribe a

particular area with a reasonable degree of precision and particularity. In *re* Angstadt, *supra*; In *re* Skoll, 523 F.2d 1392, 187 USPQ 481 (CCPA 1975); In *re* Watson, 517 F.2d 465, 186 USPQ 11 (CCPA 1975); In *re* Moore, *supra*. Therefore, the rejection of claims 64 and 68-72 under the *second* paragraph of 35 USC 112 is reversed.

[4]The examiner's general ground and his ground (b) raise a lack of enablement issue properly arising under the *first*, not the second, paragraph of §112. Ground (b) simply supplies the examiner's reasoning in support of the rejection of the claims under §112, first paragraph, as "broader than the enabling disclosure."

As appellants state, the crux of this lack of enablement rejection is that although the specification describes how the halogen atoms bonded to the dihalobenzenoid compound (the E' precursor compound) must be activated in order for polymerization to occur, the claims at issue do not recite a numerical definition of the degree of activation (a minimum sigma a6value) required from the electron withdrawing group. The PTO position is that the claims must recite a minimum sigma a7value in order to conform the scope of the claims to the scope of enablement provided by the specification. The PTO relies on statements [A] and [B] to prove that the scope of enablement

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provided by the specification is not commensurate with the scope of the claims.

[5]First, we note that it is the function of the specification, not the claims, to set forth the "practical limits of operation" of an invention. In *re* Rainer, 49 CCPA 1243, 1248, 305 F.2d 505, 509, 134 USPQ 343, 346 (1962). One does not look to claims to find out how to practice the invention they define, but to the specification. In *re* Roberts, 470 F.2d 1399, 1403, 176 USPQ 313, 315 (CCPA 1973); In *re* Fuetterer, 50 CCPA 1453, 319 F.2d 259, 138 USPQ 217 (1963).

[6]Second, we note that the specification *as a whole* must be considered in determining whether the scope of enablement provided by the specification is commensurate with the scope of the claims. In *re* Moore, *supra* at 1047, 439 F.2d at 1235, 169 USPQ at 238-39.

The present specification includes broad statements such as: "Any electron withdrawing group can be employed as the activator group in these compounds." The specification also discusses preferred embodiments, alternative embodiments, and the practical limits of operation.

Statement [A] describes preferred embodiments and practical limits of operation. It says that electron withdrawing groups having a high sigma a1value ("preferably above 1.0") are preferred and that the practical limit of operation of the polymerization reaction is reached when the electron withdrawing group has a sigma a2value of 0.7 (at that value the reaction rate "may be somewhat low").

Statement [B] describes an alternative embodiment ("a plurality of electron withdrawing groups") and the practical limit of operation for this embodiment. It states that the cumulative

sigma a3influence should be "at least about +0.7."

[7]The PTO would limit appellants to claims reciting a sigma a4value of at least 0.7. This view is improper because it requires the claims to set forth the practical limits of operation for the invention and it effectively ignores the scope of enablement provided by the specification as a whole. As we said in *In re Goffe*, 542 F.2d 564, 567, 191 USPQ 429, 431 (CCPA 1976):

[T]o provide effective incentives, claims must adequately protect inventors. To demand that the first to disclose shall limit his claims to what he has found will work or to materials which meet the guidelines specified for "preferred" materials in a process such as the one herein involved would not serve the constitutional purpose of promoting progress in the useful arts. See *In re Fuetterer*, 50 CCPA 1453, 1462, 319 F.2d 259, 265, 138 USPQ 217, 223 (1963). [Footnote omitted.]

The rejection of claims 64 and 68-72 under the *first* paragraph of 35 USC 112 is reversed.

II. The Rejection of Claims 1-9, 64, and 68-70 Under §102 or §103, Raising Issues Under §112 and §120

[8]We are convinced that the invention recited in claim 1 is "disclosed in the manner provided by the first paragraph of section 112" in the 1963 application and that claim 1 is therefore entitled to the benefit of the 1963 filing date. ¹⁹ The only inquiry is whether, after exclusion from the original claims of two species specifically disclosed in the 1963 application, the 1963 disclosure satisfies §112, first paragraph, for the "limited genus" ²⁰ now claimed.

While the board found that "no antecedent basis exists in the parent case" for the "limited genus" in claim 1, we see more than ample basis for claims of such scope. The 1963 disclosure is clearly directed to polymers of the type claimed. Fifty specific choices are mentioned for the E precursor compound, a broad *class* is identified as embracing suitable *choices* for the E' precursor compound, and twenty-six "examples" are disclosed which detail fifteen species of polyarylene polyethers. Only fourteen of those species and twenty-three of the "examples" are within the scope of the claims now on appeal. Two of the many choices for E and E' precursor compounds are deleted from the protection sought, because appellant is *claiming less* than the full scope of his disclosure. But, as we said in *In re Wertheim*, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976):

Inventions are constantly made which turn out not to be patentable, and applicants frequently discover during the course of prosecution that only a part of what they invented and originally claimed is patentable.

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[9]It is for the inventor to decide what *bounds* of protection he will seek. *In re Saunders*, 58

CCPA 1316, 1327, 444 F.2d 599, 607, 170 USPQ 213, 220 (1971). To deny appellants the benefit of their grandparent application in this case would, as this court said in Saunders:

* * * let form triumph over substance, substantially eliminating the right of an applicant to retreat to an otherwise patentable species merely because he erroneously thought he was first with the genus when he filed.

The board cited as "controlling" the decisions of this court in *In re Welstead*, 59 CCPA 1105, 463 F.2d 1110, 174 USPQ 449 (1972); *In re Lukach*, 58 CCPA 1233, 442 F.2d 967, 169 USPQ 795 (1971); and *In re Smith*, 59 CCPA 1025, 458 F.2d 1389, 173 USPQ 679 (1972). Those decisions, because of important factual distinctions, are not controlling.

In *Welstead* the applicant was attempting to introduce into his claims a new subgenus where " * * * the specification * * * contained neither a description * * * of the [subgenus] * * * nor descriptions of the species thereof amounting in the aggregate to the same thing * * *." *Welstead* conceded the absence from his disclosure of compounds of the "second type" within the new subgenus. *Welstead* is thus clearly distinguishable from the present case, in which appellants' grandparent application contains a broad and complete generic disclosure, coupled with extensive examples fully supportive of the limited genus now claimed. Indeed, *Welstead* might have well been cited by the board in support of a decision contrary to that reached, in view of what this court there implied concerning the possibility that "descriptions of species amounting in the aggregate to the same thing" may satisfy the description requirements of 35 USC 112, paragraph one.

Similarly, in *Lukach* we noted that " * * * the grandparent application here does not disclose any defined genus of which the presently claimed copolymers are a subgenus." That is not the fact here. Appellants' grandparent application clearly describes the genus and the two special classes of polymer materials excluded therefrom.

In *Smith* the applicant sought the benefit of his prior application for a broadened generic claim, replacing the claim limitation "at least 12 carbon atoms * * *" with a new limitation calling specifically for 8 to 36 carbon atoms, where there was no disclosure of either the range itself or of a sufficient number of species to establish entitlement to the claimed range. Appellants, in contrast to the applicant in *Smith*, are narrowing their claims, and the full scope of the limited genus now claimed is supported in appellants' earlier application, generically and by specific examples.

[10]The notion that one who fully discloses, and teaches those skilled in the art how to make and use, a genus and numerous species therewithin, has somehow failed to disclose, and teach those skilled in the art how to make and use, that genus minus two of those species, and has thus failed to satisfy the requirements of §112, first paragraph, appears to result from a hypertechnical application of legalistic prose relating to that provision of the statute. All that happened here is that appellants narrowed their claims to avoid having them read on a lost interference count.

[11]The board indicated that "it is manifestly immaterial" *why* appellants limited their claims.

Though it is true that insufficiency under §112 could not be cured by citing the causes for such insufficiency, it is not true that the factual context out of which the question under §112 arises is immaterial. Quite the contrary. Here, as we hold on the facts of this case, the "written description" in the 1963 specification supported the claims in the absence of the limitation, and that specification, having described the whole, necessarily described the part remaining. The facts of the prosecution are properly presented and relied on, under these circumstances, to indicate that appellants are merely excising the invention of another, to which they are not entitled, and are not creating an "artificial subgenus" or claiming "new matter."

In summary, and for the reasons discussed, the rejections of claims 64 and 68-72 under §112, first and second paragraphs, are reversed; appellants' 1963 disclosure satisfied §112, first paragraph, with respect to claims 1-9, 64, and 68-70 and appellants are, therefore, entitled to the benefit of their 1963 filing date under 35 USC 120. The Netherlands patent is thus rendered unavailable as a prior art reference, and the rejection of the claims under 35 USC 102 or 103 is reversed.

Footnotes

Footnote 1. Claims 10-54 and 65-67 stand allowed. A petition for reconsideration was denied by the board.

Footnote 2. The - O - linkages in the general formula are called ether linkages.

Footnote 3. A dihydric phenol is a type of aromatic organic compound in which two hydroxy (-OH) groups are attached directly to a benzene ring.

Footnote 4. An electron withdrawing group is a substituent which withdraws electrons from the aromatic ring to which it is attached.

Footnote 5. An aromatic ring bearing substituents on adjacent carbon atoms is called ortho substituted.

Footnote 6. An aromatic ring bearing substituents on opposite carbon atoms is called para substituted.

Footnote 7. Appellants' brief specifically refers to one of the publications cited (Chem. Rev., 53, 222 [1953]) and states that its author (Jaffe) defines the sigma a1 value as a "special substituent constant" for the "Hammett equation" which is an empirically derived formula intended to show a general quantitative relation between the nature of a given substituent and the reactivity of a side chain. Thus, sigma a2 values are based on experimental data and they measure the "activation energy" of a given substituent (electron withdrawing group).

Footnote 8. The -SO₂- linking group in species [1] is called a sulfone group.

Footnote 9. The -CO- linking group in species [2] is called a carbonyl group.

Footnote 10. Interference No. 95,807, declared February 17, 1967.

Footnote 11. Another party did appeal. See *Vogel v. Jones*, 486 F.2d 1068, 179 USPQ 425 (CCPA 1973).

Footnote 12. The provisos actually exclude more than species [1] and [2]. For example, polymers similar to species [1] and [2] but having substituted ring structures are also excluded.

Footnote 13. §120. Benefit of earlier filing date in the United States.

An application for patent *for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States* by the same inventor shall have the same effect, *as to such invention*, as though filed on the date of the prior application, if filed before the patenting or abandonment of or termination of proceedings on the first application or on an application similarly entitled to the benefit of the filing date of the first application and if it contains or is amended to contain a specific reference to the earlier filed application. [Emphasis added.]

Footnote 14.

§112. Specification.

The specification shall contain *a written description of the invention*, and of the manner and process of making and using it, *in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same*, and shall set forth the best mode contemplated by the inventor of carrying out his invention. [Emphasis added.]

Footnote 15.

§112. Specification.

* * *

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Footnote 16.

Claims 68-70 are product-by-process claims.

Footnote 17. We do not speculate on whether or not the claim would be unduly broad if the questioned limitation were removed. But undue breadth is not indefiniteness. In *re Borkowski*, 57 CCPA 946, 422 F.2d 904, 164 USPQ 642 (1970). This claim is definite either with or without the phrase "to activate a halogen atom."

Footnote 18. In re Merat, 519 F.2d 1390, 186 USPQ 471 (CCPA 1975), cited by the Solicitor, affirmed a §112, second paragraph, rejection because the same word ("normal") was used in the claims in one sense and in the specification in a different sense, thus rendering the claims indefinite. There is nothing akin to the Merat situation here.

Footnote 19. Appellants have not argued the claims separately, thus, claims 2-9, 64, and 68-70 stand or fall with claim 1.

Footnote 20. Appellants refer to the subject matter recited in claim 1 as a "limited genus." The board called it an "artificial subgenus." We use appellants' terminology. Whatever the label, the issue is the same.

Dissenting Opinion Text

Dissent By:

Lane, Judge, dissenting in part,

I would affirm the rejection of claims 64 and 68-72 under §112, paragraphs 1 and 2, because the specification indicates that a

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minimum sigma value of +0.7 is an *essential requisite*. These claims fail to recite this requisite, thus fail to define appellants' invention and are broader than the disclosure. I concur in reversing the rejection of claims 1-9.

- End of Case -